

WHAT IS CLAIMED AS NEW AND DESIRED TO BE SECURED BY
LETTERS PATENT OF THE UNITED STATES IS:

1. An element for performing a liquid assay, said element comprising therein a channel structure defining a sample well and a reaction volume in communication with each other, said channel structure having a geometry causing a liquid sample placed in the said sample well to be drawn into and filling the said reaction volume via capillary action, wherein after the said reaction volume is filled the said liquid sample remains stationary therein.

2. The element of Claim 1, said element comprising a means for monitoring a reaction in the said reaction volume.

3. The element of Claim 1, said element comprising a means for channelling light from an outside source to the said reaction volume.

4. The element of Claim 1, said element comprising a means for detecting light emitted from the said reaction volume.

5. The element of Claim 4, wherein the said means for detecting light comprises a means for detecting scattered light emitted from the said reaction volume.

6. The element of Claim 4, wherein the said means for detecting light comprises a means for detecting reflected light emitted from the said reaction volume.

7. The element of Claim 2, said element being disposed in close proximity to a permanent magnet and an electromagnet, wherein the said permanent magnet is situated between the said electromagnet and the said element.

8. The element of Claim 1, said element comprising:

a base comprising a major surface, an overlay on said base, and a cover situated on said overlay, opposite said base;

said overlay comprising therein a channel structure defining a sample well and a reaction space in communication with the said sample well;

said cover comprising therein a means for adding a sample to be analyzed to the said sample well;

a means for channelling light from an outside source to the reaction chamber; and

a means for detecting light emitted from the said reaction chamber.

9. The element of Claim 8, said element comprising a vent, and a conduit in communication with both the said sample well and the said reaction space.

10. The element of Claim 1, said element comprising a liquid absorbing matrix for withdrawing fluid from the said reaction volume.

11. The element of Claim 2, wherein the said means for monitoring a reaction in the said reaction volume employs light and wherein at least some of the external surfaces of the reaction slide not used for transmission of light to the reaction volume or for detection of light emitted from the said reaction volume are opaque to light.

12. The element of Claim 3, wherein the said means for channelling light from an outside source to the said reaction volume comprises an optical fiber assembly.

13. The element of Claim 8, said element comprising a cover having a length which is less than the length of the said overlay and less than the length of the said base, said element comprising an end cover coplanar with the said cover and spaced therefrom.

14. The element of Claim 8, wherein the distal end of the said overlay is open so that the said reaction space vents longitudinally between the said cover and the said base.

15. The element of Claim 14, said element comprising a liquid absorbing matrix fixed to the said base and overhanging the said distal end of the said cover.

16. The element of Claim 8, wherein the distal end of the said overlay is open so that the said

reaction space vents longitudinally between the said cover and the said base; said overlay being provided with a first conduit communicating the said sample well with the said reaction volume, and a second conduit extending backward to a point beyond the sample well wherein the end portion of the said second conduit is a means for determining that proper filling of the said reaction volume with a fluid has been achieved.

17. The element of Claim 8, wherein the said cover comprises a major planar segment having lateral sides bent downwardly to form walls and then laterally to form tabs, said tabs being bound to the said base.

18. The element of Claim 1, wherein the internal surfaces of the said element have been treated to increase their hydrophilicity.

19. The element of Claim 8, wherein the said spacer has a thickness of from 0.001 to 0.02 inches.

20. The element of Claim 16, wherein the said spacer has a thickness of from 0.002 to 0.008 inches.

21. A method for performing an assay, comprising:
adding a sample to the sample well of an element comprising a channel structure defining a sample well and a reaction volume in communication with each other, wherein the said element contains a measured amount of at least one reagent situated in the said reaction volume; wherein a specific volume of the said

biological sample is drawn into the said reaction volume by capillary action and contacts the said reagent to initiate a reaction between the said sample and the said reagent; and

monitoring said reaction.

22. The method of Claim 21, wherein the said assay is the assay of a biological sample.

23. The method of Claim 22, comprising monitoring the said reaction by irradiating light into the said reaction volume and monitoring scattering of the light in the said reaction volume.

24. The method of Claim 21, comprising:
using an element containing inert magnetic particles within the said reaction volume in association with a permanent magnet and a electromagnet disposed in close proximity to the said element and wherein the said permanent magnet is situated between the said electromagnet;

applying cycles of energy to the said electromagnet to cause a change in orientation of the said inert magnetic particles; and

monitoring the said change in orientation of the said inert magnetic particle to monitor the said reaction.

25. An assembly comprising at least two of the elements of Claim 1 in communication with each other.